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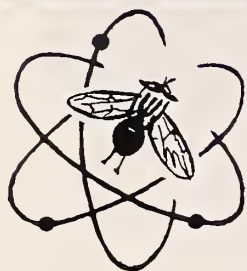
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Atoms vs. the Screwworm



The screwworm fly (Bn4384) is bluish in color and about three times the size of a housefly. The female lays about 200 eggs (Bn4375) on the edges of cuts or wounds or on navels of new born warmblooded animals. Eggs hatch into larvae (Bn1416) that feed on the living flesh injuring and eventually killing untreated animals. Grown larvae drop from the wound to the ground where they burrow into the soil and go into the pupal stage (Bn4380). Flies emerge from the pupal cases and work their way to the surface. The average life cycle is about 21 days.

Radiant energy from cobalt-60 is the key weapon U. S. Department of Agriculture scientists will use in the cooperative campaign with the Florida Livestock Board to eradicate the screwworm from Florida and the Southeast, where this livestock pest causes losses of over \$20 million a year. Plans for the campaign are now under way (see USDA release 3047-57).

Agricultural Research Service entomologists at Kerrville, Texas, found that pupae of the screwworm exposed to the proper amount of radiation produce sterile adult flies. This led to the plan of using laboratory-reared sterile flies to reduce the population of screwworms in infested areas and eventually to eliminate the pest. Female screwworm flies mate only once. Tests showed that when sterile males greatly outnumber the native or wild male flies, eggs from most female flies do not hatch. Mass liberation of sterile flies by air, at carefully timed intervals, eradicated the pest from the Caribbean island of Curacao in 1954. Pilot-plant operations in the vicinity of Orlando, Florida, in 1956-57 have also given promising results.

In the full-scale program in peninsular Florida and southeast Georgia, which should begin operation in the summer of 1958, it is planned to release sterile flies (half of them males) at the rate of 50 million a week over an area of 50,000 square miles. The flies carry no radioactivity and are not household or picnic pests. Livestock owners are being asked to use every possible control measure to hasten eradication.

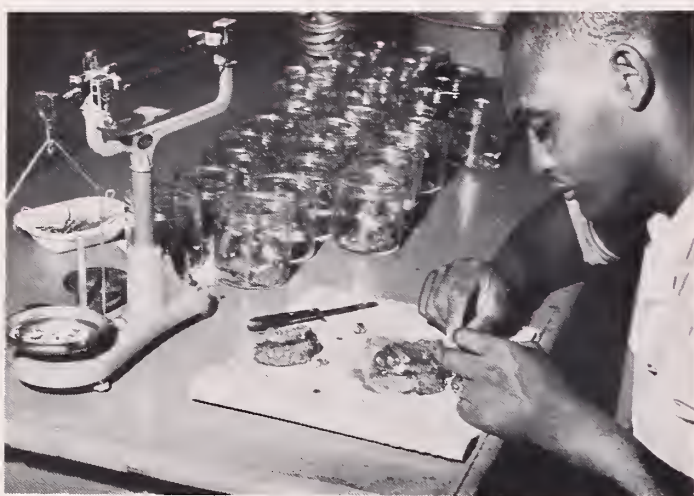
The pictures that follow show the life cycle of the screwworm and the operations of mass rearing, sterilizing, and distribution by aircraft during the pilot field test near Orlando, Florida.



N-22001 - Permanent wire cages for laboratory brood stock are shown here on lower shelf. Disposable cages made of cardboard and cloth on the upper shelf will also be used in the large scale operation. James Honor, laboratory attendant, is preparing cage for egg-laying flies.



Bn-4387.--In the laboratory, female screwworm flies are induced to lay their white egg masses on a specially prepared warm meat mixture. Jars containing the mixture are placed in cages when the flies are 7 days old.



N-22003.--Egg masses are collected each day and weighed to determine the number (20,000 eggs weigh one gram). The eggs are transferred to moist paper and kept overnight while they hatch. Kenneth Hamm weighs the eggs.



N-22036.--Screwworm larvae are reared in shallow vats, in a medium of finely ground lean meat, citrated blood, water, and a small amount of formaldehyde. Frank Dudley checks temperature of mixture to be sure it remains at required 100°F. Full-grown larvae crawl to edge of vat and drop into sand trays below.



N-22039.--Screwworm larvae pupate in the sand trays held here. Every 8 hours the pupae are sifted from the sand and larvae. Pupae are then placed in screened aluminum trays and rinsed to minimize odor from larval medium, to remove sand, and to improve fly emergence.



N-22041.--Screwworm pupae, 18,000 to each tray, are held 5½ to 6½ days in cabinets air conditioned at 80°F and 95 percent humidity, before irradiation.



N-22031.--USDA scientists determined that irradiation of pupae within 2 days of adult emergence is the best time to bring about sterilization of screwworm flies. Screwworm pupae are poured into an aluminum canister for irradiation. Two quarts of pupae (about 18,000) make a load.



N-22033.--Radioactive cobalt is in the large lead cask in center. Canister of screwworm pupae is manipulated in and out of irradiation chamber by pneumatic hoist and grapple. Pupae are exposed for $6\frac{1}{2}$ minutes to 8,000 roentgens of radiation. W. D. New operates the controls, Carlton Burroughs monitors for radioactivity.



N-22028.--During the screwworm pilot-plant operation, this building housed the radioactive cobalt unit for irradiating screwworm pupae. Aluminum construction is used for the building to minimize scattering of radiation. Large-scale eradication program will use larger facilities.



N-22029.--Film badge and pocket chambers carried by technician, W. D. New, detect radiation exposure and must be put on before entering building containing the cobalt-60 unit used for irradiating screwworm pupae.



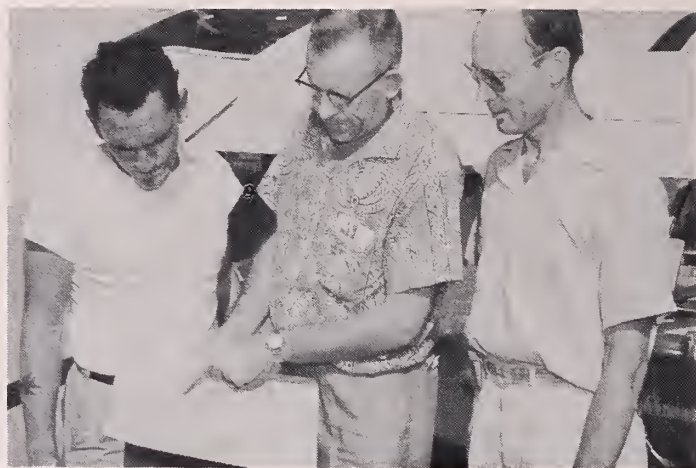
N-22005.--A measureful of irradiated pupae (about 550) is placed in partitioned and ventilated cardboard boxes. W. D. New, technician, fills the boxes.



N-22006.--Trays of the boxes containing irradiated screwworm pupae are held in air-conditioned room (80°F and 80 percent humidity) by Victor Blackwelder, to await emergence of sterile flies. There is no danger in handling the pupae or the flies that emerge from them--they give off no radiation.



N-22008.--Leslie Britt prepares to load boxes containing sterile screwworm flies on waiting plane. Before leaving the laboratory flies are given a meal of honey by spreading the liquid in thin "strings" over the screen top. An air-conditioned station wagon is used to transfer the trays of fly boxes to the airport.



N-22014.--Pilot Ralph Loffler, (right) and USDA release operator, Terry Fye, (left) are briefed on the day's flight pattern by USDA specialist C. N. Husman, during pilot-plant screwworm operation.



N-22016.--Manual device for releasing boxes of sterile screwworm flies used in experimental work is shown here. Automatic releasing device developed by USDA equipment specialist, C. N. Husman, is now available. Rate of release of sterile screwworm flies will vary depending on fly population densities as determined by field surveys.



N-21999.--A. H. Baumhover, USDA entomologist, examines egg masses taken from wounded animals to determine whether the eggs are fertile. Progress of eradication program will be measured by reduction of fertile egg masses collected, among other methods.



N-22044.--Livestock owners will be asked to collect eggs and larvae from screwworm infested animals in their herds. This information will help to determine the number of sterile flies to be released in a given area and the period over which such releases may be required.



N-22021.--To hasten screwworm eradication, livestock owners are urged to cooperate by keeping records of screwworm infestation occurring in their herds, and by using approved management methods to reduce the screwworm population.

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